

LISTING OF CLAIMS:

- [illegible]

each of R⁵ to R⁸ is hydrogen, a hydroxyl group or a straight, branched or cyclic, monovalent hydrocarbon group of 1 to 15 carbon atoms which may contain a hetero atom, at least one of R⁵ to R⁸ contains a hetero atom, any two of R⁵ to R⁸ may bond together to form a

ring, wherein the ring forming two R's together represent a straight, branched or cyclic, divalent hydrocarbon group of 1 to 15 carbon atoms which may contain a hetero atom,

R^9 and R^{10} each are hydrogen or methyl,

each of R^{11} to R^{14} is hydrogen or a straight, branched or cyclic, monovalent hydrocarbon group of 1 to 15 carbon atoms which may contain a hetero atom, a pair of R^{11} and R^{12} , a pair of R^{11} or R^{12} and R^{13} , a pair of R^{11} or R^{12} and R^{14} , or a pair of R^{13} and R^{14} may bond together to form a ring, wherein each pair represents a straight, branched or cyclic, divalent hydrocarbon group of 1 to 15 carbon atoms which may contain a hetero atom,

R^{15} is hydrogen, methyl or $CH_2CO_2R^{17}$,

$R^{15'}$ is hydrogen, methyl or $CH_2CO_2R^{17'}$,

$R^{15''}$ is hydrogen, methyl or $CH_2CO_2R^{17''}$,

$R^{15'''}$ is hydrogen, methyl or $CH_2CO_2R^{17'''}$,

R^{16} is hydrogen, methyl or CO_2R^{17} ,

$R^{16'}$ is hydrogen, methyl or $CO_2R^{17'}$,

$R^{16''}$ is hydrogen, methyl or $CO_2R^{17''}$,

$R^{16'''}$ is hydrogen, methyl or $CO_2R^{17'''}$,

R^{17} , $R^{17'}$, $R^{17''}$ and $R^{17'''}$ may be identical or different between R^{15} and R^{16} , between $R^{15'}$ and $R^{16'}$, between $R^{15''}$ and $R^{16''}$ and between $R^{15'''}$ and $R^{16'''}$, respectively, and each is a straight, branched or cyclic alkyl group of 1 to 15 carbon atoms,

R^{18} is hydrogen or a monovalent hydrocarbon group of 1 to 15 carbon atoms containing a carboxyl or hydroxyl group,

R^{19} is a monovalent hydrocarbon group of 2 to 15 carbon atoms containing at least one partial structure selected from the group consisting of ether, aldehyde, ketone, ester, carbonate, acid anhydride, amide and imide,

R^{20} is a polycyclic hydrocarbon group of 7 to 15 carbon atoms or an alkyl group containing a polycyclic hydrocarbon group,

R^{21} is an acid labile group,

k is 0 or 1,

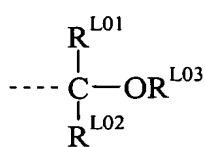
x_1 , x_2 , x_3 , a, b, c and d represent a molar compositional ratio of the recurring units associated therewith, satisfying $x_1+x_2+x_3+a+b+c+d = 1$, x_1 , x_2 , x_3 , a, b and c are numbers inclusive of 0, d is a number of more than 0, ~~all of x_1 , x_2 and x_3 are not equal to 0 at the same time~~ provided that at least two of x_1 , x_2 and x_3 are not equal to 0.

2. (Canceled)

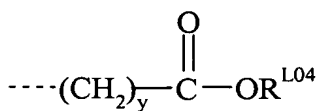
3. (Original) A resist composition comprising the polymer of claim 1.

4. (Original) A process for forming a resist pattern comprising the steps of:
applying the resist composition of claim 3 onto a substrate to form a coating,
heat treating the coating and then exposing it to high-energy radiation or electron beam through a photo mask, and
optionally heat treating the exposed coating and developing it with a developer.

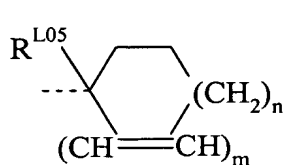
5. (New) The polymer of claim 1 wherein the acid labile group represented by R^{21} is an acid labile group selected from the group consisting of groups of the following general formulae (L1) to (L4):



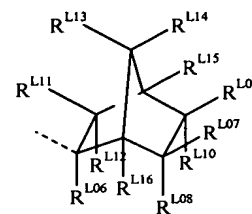
(L1)



(L2)



(L3)



(L4)

wherein the broken line denotes a free valence bond, R^{L01} and R^{L02} are hydrogen or straight, branched or cyclic alkyl groups of 1 to 18 carbon atoms, R^{L03} is a monovalent hydrocarbon group of 1 to 18 carbon atoms which may contain a hetero atom, a pair of R^{L01} and R^{L02} , R^{L01} and R^{L03} , or R^{L02} and R^{L03} may form a ring, wherein each of R^{L01} , R^{L02} and R^{L03} is a straight or branched alkylene group of 1 to 18 carbon atoms when they form a ring,

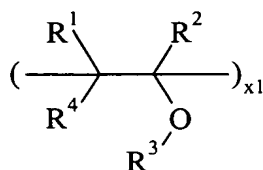
R^{L04} is a tertiary alkyl group of 4 to 20 carbon atoms, a trialkylsilyl group in which each alkyl moiety has 1 to 6 carbon atoms, an oxoalkyl group of 4 to 20 carbon atoms, or a group of formula (L1),

R^{L05} is a monovalent hydrocarbon group of 1 to 8 carbon atoms which may contain a hetero atom or a substituted or unsubstituted aryl group of 6 to 20 carbon atoms,

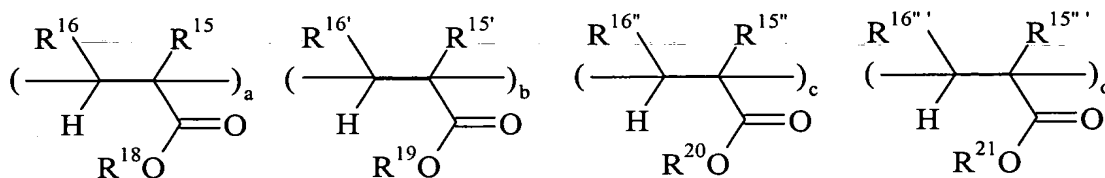
R^{L06} is a monovalent hydrocarbon group of 1 to 8 carbon atoms which may contain a hetero atom or a substituted or unsubstituted aryl group of 6 to 20 carbon atoms, and

R^{L07} to R^{L16} independently represent hydrogen or monovalent hydrocarbon groups of 1 to 15 carbon atoms which may contain a hetero atom, or R^{L07} to R^{L16} , taken together, form a ring, wherein each of R^{L07} to R^{L16} represents a divalent $\text{C}_1\text{-C}_{15}$ hydrocarbon group which may contain a hetero atom, when they form a ring, or two of R^{L07} to R^{L16} which are attached to adjoining carbon atoms may bond together directly to form a double bond.

6. (New) A polymer comprising recurring units of the following general formula (1a) and having a weight average molecular weight of 1,000 to 500,000,



(1a)



wherein R^1 and R^2 each are hydrogen or methyl,

R^3 and R^4 each are hydrogen or a straight, branched or cyclic, monovalent hydrocarbon group of 1 to 15 carbon atoms which may contain a hetero atom, and R^3 and R^4 may bond together to form a ring, wherein R^3 and R^4 together represent a straight, branched or cyclic, divalent hydrocarbon group of 1 to 15 carbon atoms which may contain a hetero atom,

R^{15} is hydrogen, methyl or $\text{CH}_2\text{CO}_2\text{R}^{17}$,

$\text{R}^{15'}$ is hydrogen, methyl or $\text{CH}_2\text{CO}_2\text{R}^{17'}$,

$\text{R}^{15''}$ is hydrogen, methyl or $\text{CH}_2\text{CO}_2\text{R}^{17''}$,

$\text{R}^{15'''}$ is hydrogen, methyl or $\text{CH}_2\text{CO}_2\text{R}^{17'''}$,

R^{16} is hydrogen, methyl or CO_2R^{17} ,

$\text{R}^{16'}$ is hydrogen, methyl or $\text{CO}_2\text{R}^{17'}$,

$\text{R}^{16''}$ is hydrogen, methyl or $\text{CO}_2\text{R}^{17''}$,

$\text{R}^{16'''}$ is hydrogen, methyl or $\text{CO}_2\text{R}^{17'''}$,

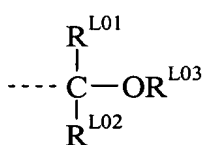
R^{17} , $R^{17'}$ and $R^{17''}$ may be identical or different between R^{15} and R^{16} , between $R^{15'}$ and $R^{16'}$, between $R^{15''}$ and $R^{16''}$, and between $R^{15'''}$ and $R^{16'''}$, respectively, and each is a straight, branched or cyclic alkyl group of 1 to 15 carbon atoms,

R^{18} is hydrogen or a monovalent hydrocarbon group of 1 to 15 carbon atoms containing a carboxyl or hydroxyl group,

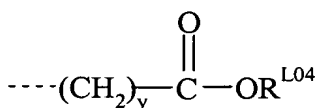
R^{19} is a monovalent hydrocarbon group of 2 to 15 carbon atoms containing at least one partial structure selected from the group consisting of ether, aldehyde, ketone, ester, carbonate, acid anhydride, amide and imide,

R^{20} is a polycyclic hydrocarbon group of 7 to 15 carbon atoms or an alkyl group containing a polycyclic hydrocarbon group,

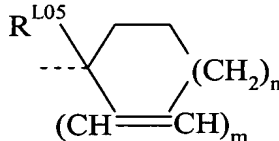
R^{21} is an acid labile group selected from the group consisting of groups of the following general formulae (L1) to (L4):



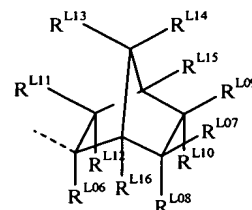
(L1)



(L2)



(L3)



(L4)

wherein the broken line denotes a free valence bond, R^{L01} and R^{L02} are hydrogen or straight, branched or cyclic alkyl groups of 1 to 18 carbon atoms, R^{L03} is a monovalent hydrocarbon group of 1 to 18 carbon atoms which may contain a hetero atom, a pair of R^{L01} and R^{L02} , R^{L01} and R^{L03} , or R^{L02} and R^{L03} may form a ring, wherein each of R^{L01} , R^{L02} and R^{L03} is a straight or branched alkylene group of 1 to 18 carbon atoms when they form a ring,

R^{L04} is a tertiary alkyl group of 4 to 20 carbon atoms, a trialkylsilyl group in which each alkyl moiety has 1 to 6 carbon atoms, an oxoalkyl group of 4 to 20 carbon atoms, or a group of formula (L1),

R^{L05} is a monovalent hydrocarbon group of 1 to 8 carbon atoms which may contain a hetero atom or a substituted or unsubstituted aryl group of 6 to 20 carbon atoms,

R^{L06} is a monovalent hydrocarbon group of 1 to 8 carbon atoms which may contain a hetero atom or a substituted or unsubstituted aryl group of 6 to 20 carbon atoms, and

R^{L07} to R^{L16} independently represent hydrogen or monovalent hydrocarbon groups of 1 to 15 carbon atoms which may contain a hetero atom, or R^{L07} to R^{L16} , taken together, form a ring, wherein each of R^{L07} to R^{L16} represents a divalent C_1 - C_{15} hydrocarbon group which may contain a hetero atom, when they form a ring, or two of R^{L01} to R^{L16} which are attached to adjoining carbon atoms may bond together directly to form a double bond,

k is 0 or 1,

x1, a, b, c and d represent a molar compositional ratio of the recurring units associated therewith, satisfying $x1+a+b+c+d = 1$, a, b and c are numbers inclusive of 0, d is a number of more than 0, x1 is not equal to 0.

7. (New) A resist composition comprising the polymer of claim 6.

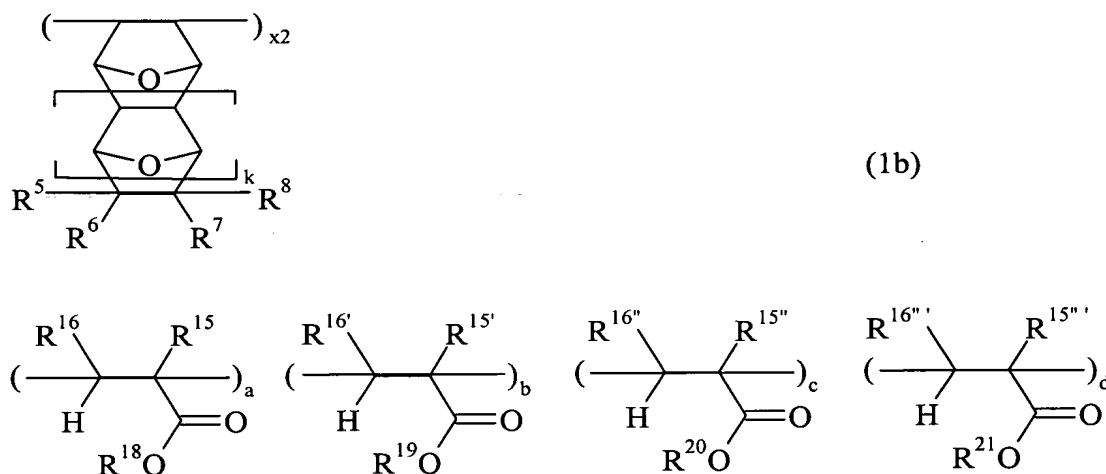
8. (New) A process for forming a resist pattern comprising the steps of:

applying the resist composition of claim 6 onto a substrate to form a coating,

heat treating the coating and then exposing it to high-energy radiation or electron beam through a photo mask, and

optionally heat treating the exposed coating and developing it with a developer.

9. (New) A polymer comprising recurring units of the following general formula (1b) and having a weight average molecular weight of 1,000 to 500,000,



wherein each of R^5 to R^8 is hydrogen, a hydroxyl group or a straight, branched or cyclic, monovalent hydrocarbon group of 1 to 15 carbon atoms which may contain a hetero atom, at least one of R^5 to R^8 contains a hetero atom, any two of R^5 to R^8 may bond together to form a ring, wherein the ring-forming two R's together represent a straight, branched or cyclic, divalent hydrocarbon group of 1 to 15 carbon atoms which may contain a hetero atom,

R^{15} is hydrogen, methyl or $\text{CH}_2\text{CO}_2R^{17}$,

$R^{15'}$ is hydrogen, methyl or $\text{CH}_2\text{CO}_2R^{17}$,

$R^{15'}$ is hydrogen, methyl or $\text{CH}_2\text{CO}_2R^{17''}$,

$R^{15''}$ is hydrogen, methyl or $\text{CH}_2\text{CO}_2R^{17''}$,

R^{16} is hydrogen, methyl or CO_2R^{17} ,

$R^{16'}$ is hydrogen, methyl or $\text{CO}_2R^{17'}$,

$R^{16''}$ is hydrogen, methyl or $\text{CO}_2R^{17''}$,

$R^{16''}$ is hydrogen, methyl or $CO_2R^{17''}$,

R^{17} , $R^{17'}$, $R^{17''}$ and $R^{17'''}$ may be identical or different between R^{15} and R^{16} , between $R^{15'}$ and $R^{16'}$, between $R^{15''}$ and $R^{16''}$, and between $R^{15'''}$ and $R^{16'''}$, respectively, and each is a straight, branched or cyclic alkyl group of 1 to 15 carbon atoms,

R^{18} is hydrogen or a monovalent hydrocarbon group of 1 to 15 carbon atoms containing a carboxyl or hydroxyl group,

R^{19} is a monovalent hydrocarbon group of 2 to 15 carbon atoms containing at least one partial structure selected from the group consisting of ether, aldehyde, ketone, ester, carbonate, acid anhydride, amide and imide,

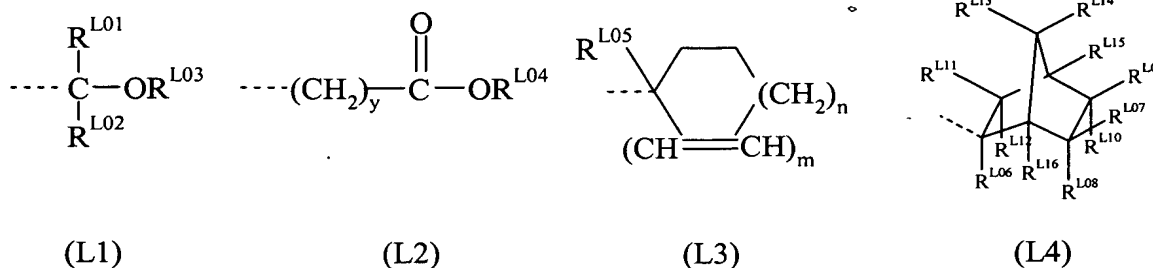
R^{20} is a polycyclic hydrocarbon group of 7 to 15 carbon atoms or an alkyl group containing a polycyclic hydrocarbon group,

R^{21} is an acid labile group,

k is 0 or 1,

x2, a, b, c and d represent a molar compositional ratio of the recurring units associated therewith, satisfying $x2+a+b+c+d = 1$, a, b and c are numbers inclusive of 0, d is a number of more than 0, x2 is not equal to 0.

10. (New) The polymer of claim 9 wherein the acid labile group represented by R^{21} is an acid labile group selected from the group consisting of groups of the following general formulae (L1) to (L4):



wherein the broken line denotes a free valence bond, R^{L01} and R^{L02} are hydrogen or straight, branched or cyclic alkyl groups of 1 to 18 carbon atoms, R^{L03} is a monovalent hydrocarbon group of 1 to 18 carbon atoms which may contain a hetero atom, a pair of R^{L01} and R^{L02} , R^{L01} and R^{L03} , or R^{L02} and R^{L03} may form a ring, wherein each of R^{L01} , R^{L02} and R^{L03} is a straight or branched alkylene group of 1 to 18 carbon atoms when they form a ring,

R^{L04} is a tertiary alkyl group of 4 to 20 carbon atoms, a trialkylsilyl group in which each alkyl moiety has 1 to 6 carbon atoms, an oxoalkyl group of 4 to 20 carbon atoms, or a group of formula (L1),

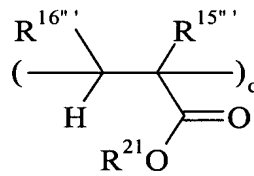
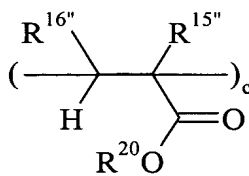
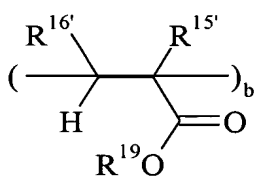
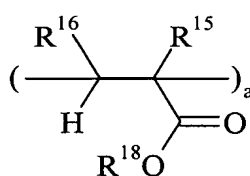
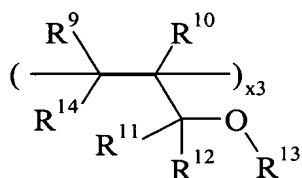
R^{L05} is a monovalent hydrocarbon group of 1 to 8 carbon atoms which may contain a hetero atom or a substituted or unsubstituted aryl group of 6 to 20 carbon atoms,

R^{L06} is a monovalent hydrocarbon group of 1 to 8 carbon atoms which may contain a hetero atom or a substituted or unsubstituted aryl group of 6 to 20 carbon atoms, and

R^{L07} to R^{L16} independently represent hydrogen or monovalent hydrocarbon groups of 1 to 15 carbon atoms which may contain a hetero atom, or R^{L07} to R^{L16} , taken together, form a ring,

wherein each of R^{L07} to R^{L16} represents a divalent C_1 - C_{15} hydrocarbon group which may contain a hetero atom, when they form a ring, or two of R^{L07} to R^{L16} which are attached to adjoining carbon atoms may bond together directly to form a double bond.

11. (New) A resist composition comprising the polymer of claim 9.
12. (New) A process for forming a resist pattern comprising the steps of:
 applying the resist composition of claim 9 onto a substrate to form a coating,
 heat treating the coating and then exposing it to high-energy radiation or electron beam through a photo mask, and
 optionally heat treating the exposed coating and developing it with a developer.
13. (New) A polymer comprising recurring units of the following general formula (1c) and having a weight average molecular weight of 1,000 to 500,000,



wherein R^9 and R^{10} each are hydrogen or methyl,

each of R^{11} to R^{14} is hydrogen or a straight, branched or cyclic, monovalent hydrocarbon group of 1 to 15 carbon atoms which may contain a hetero atom, a pair of R^{11} and R^{12} , a pair of R^{11} or R^{12} and R^{13} , a pair of R^{11} or R^{12} and R^{14} , or a pair of R^{13} and R^{14} may bond together to form a ring, wherein each pair represents a straight, branched or cyclic, divalent hydrocarbon group of 1 to 15 carbon atoms which may contain a hetero atom,

R^{15} is hydrogen, methyl or $CH_2CO_2R^{17}$,

$R^{15'}$ is hydrogen, methyl or $CH_2CO_2R^{17'}$,

$R^{15''}$ is hydrogen, methyl or $CH_2CO_2R^{17''}$,

$R^{15'''}$ is hydrogen, methyl or $CH_2CO_2R^{17'''}$,

R^{16} is hydrogen, methyl or CO_2R^{17} ,

$R^{16'}$ is hydrogen, methyl or $CO_2R^{17'}$,

$R^{16''}$ is hydrogen, methyl or $CO_2R^{17''}$,

$R^{16'''}$ is hydrogen, methyl or $CO_2R^{17'''}$,

R^{17} , $R^{17'}$, $R^{17''}$ and $R^{17'''}$ may be identical or different between R^{15} and R^{16} , between $R^{15'}$ and $R^{16'}$, between $R^{15''}$ and $R^{16''}$, and between $R^{15'''}$ and $R^{16'''}$, respectively, and each is a straight, branched or cyclic alkyl group of 1 to 15 carbon atoms,

R^{18} is hydrogen or a monovalent hydrocarbon group of 1 to 15 carbon atoms containing a carboxyl or hydroxyl group,

R^{19} is a monovalent hydrocarbon group of 2 to 15 carbon atoms containing at least one partial structure selected from the group consisting of ether, aldehyde, ketone, ester, carbonate, acid anhydride, amide and imide,

R^{20} is a polycyclic hydrocarbon group of 7 to 15 carbon atoms or an alkyl group containing a polycyclic hydrocarbon group,

R^{21} is an acid labile group selected from the group consisting of groups of the following general formulae (L1) to (L4):



x_3 , a, b, c and d represent a molar compositional ratio of the recurring units associated therewith, satisfying $x_3 + a + b + c + d = 1$, x_3 , a, b and c are numbers inclusive of 0, d is a number of more than 0, x_3 is not equal to 0.

14. (New) A resist composition comprising the polymer of claim 13.

15. (New) A process for forming a resist pattern comprising the steps of:

applying the resist composition of claim 13 onto a substrate to form a coating,
heat treating the coating and then exposing it to high-energy radiation or electron beam through a photo mask, and
optionally heat treating the exposed coating and developing it with a developer.